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PAA 11-503

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of )  
Cormac Herley ) Group Art Unit: 2612  
Application No.: 09/126,622 ) Examiner: Ngoc Yen T Vu  
Filed: July 30, 1998 ) Confirmation No.: 9131  
For: PROCESSING IMAGES IN A )  
DIGITAL CAMERA (as amended) )

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REQUEST FOR RECONSIDERATION

Technology Center 2600

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated July 31, 2003, reconsideration and allowance of the present application are respectfully requested. Claims 1-10, 18 and 26 had been previously been canceled. Claims 14, 22 and 29 are the only pending independent claims. All of the remaining claims depend from claims 14, 22 and 29.

In numbered paragraph 4 on page 2 of the Office Action, claims 11-16, 19-24 and 27-31 were rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 6,181,826 (Weldy) in view of U.S. Patent No. 5,838,834 (Saito) and further in view of newly cited U.S. Patent No. 5,648,816 (Wakui). In numbered paragraph 5 on page 5 of the Office Action, claims 12, 25 and 32 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Weldy, Saito and Wakui patents in further combination with U.S. Patent No. 6,263,106 (Yamagata). Applicants' claims 14, 22 and 29 are allowable over the Weldy, Saito, Wakui and Yamagata patents, regardless of whether these patents are considered individually or in the combination relied upon by the Examiner.

As described in the summary on page 2 of Applicant's specification, exemplary embodiments of the present invention provide for higher quality digital images in a digital camera system when fewer than the maximum number of images permitted by the size of a picture memory have been taken. Image compression is performed to produce a primary compressed data set and an auxiliary compressed data set. The primary compressed data set is sufficient to reproduce an image at a first quality level. The primary and auxiliary data sets can be combined to reproduce the same image at a higher quality level. As images are captured, primary and auxiliary data sets are formed for each image and the primary data set is stored in a primary storage area of the picture memory. If storage space is available, the auxiliary data set is also stored in a secondary storage area of the picture memory. When the picture memory becomes filled with primary and auxiliary data sets, <sup>in</sup> space ~~is~~ the secondary storage area containing auxiliary sets is released to store additional primary data sets. As such, exemplary embodiments of the present invention provide functional capabilities which add intelligence to the manner by which a compressed digital image of varying regulation is stored and/or removed from a picture memory.

The foregoing features are broadly encompassed by Applicant's independent claim 14. This claim is directed to a method for processing images in a digital camera wherein the digital camera includes an image storage device having primary and secondary storage areas. This method includes generating from a raw image, including employing a first quantizing step, a first compressed image data set suitable for reproducing substantially the entire image at a first quality level. The method also includes generating from the raw image, including employing a second quantizing step independent of the first quantizing

step, a second compressed image data set which when combined with the first compressed image data set reproduces substantially the entire image at a second, higher quality level. In accordance with the claim 14 method, space in the secondary storage area of the image storage device is **released** if insufficient space is available in the primary storage area of the image storage device used to store the first compressed image data set.

None of the patents to Weldy, Saito, Wakui or Yamagata, even when considered in the combination relied upon by the Examiner, teach or suggest such a method.

The Weldy patent is directed to reconstructing an M level image by forming at least two non-dependent digital images from an original digital image and by determining a quantization level M of the original digital image and then forming the two non-dependent images by quantizing the original M level image to two M/2 level images, one being rounded down in value and the other being rounded up in value (see Abstract). The reconstructed image having a higher resolution than any of the non-dependent M/2 digital images is formed by combining and averaging at least two of the non-dependent images. Figure 1 of the Weldy patent describes the processing of digital images such that they can be written onto a compact disk by a CD writer 5. A CD player 7 is used to read user selected images from the compact disk under user control and to reconstruct and to forward the selected images for display on, for example, a standard TV display 8 or to cause a printing of the selected image by a printer, such as a thermal printer 9. In a variant, the CD player 7 may be a computer with a photo-CD reader incorporated therein and images on the compact disk may be read out for display on a computer monitor.

Column 3, lines 31-45 of the Weldy patent describe the receipt of a digitized image from a scanner 3 having high resolution which permits certain printers to print images that correspond to photographic quality originals. This portion of the Weldy specification describes that by manipulating the images through a hierarchical residual based scheme, a number of images of differing resolution levels can be generated and written on the compact disk. Portions of the specification referred to by the Examiner, such as column 7, lines 63-67, describe storing representations of images quantized using different quantizers for purposes of reconstructing the image for viewing or printing.

The Weldy patent is not directed to the efficient storage of image information generated using a first quantizing step and a second quantizing step independent of the first quantizing step, whereby space in a secondary storage area of an image storage device is released if insufficient space is available in a primary storage area of the image storage device to store the first compressed image data set. Because such features are broadly encompassed in independent claims 14, 22 and 29, these claims are allowable over the Weldy patent.

The Saito, Wakui and Yamagata patents relied upon by the Examiner, fail to overcome the deficiencies of the Weldy patent. As such, independent claims 14, 22 and 29 are considered allowable over the Weldy, Saito, Wakui and Yamagata patents even when considered in the combination relied upon by the Examiner.

On page 3 of the Office Action, the Examiner acknowledges that "Claims 19-22 differ from Weldy in that the claim further requires that the system of processing images [be] in a digital camera." The Saito patent was cited by the Examiner as disclosing that "it

is well known in the art to process and compress digital images having different quantizing and coding steps in a digital camera.”

The Saito patent is directed to an image processing apparatus and method which temporarily stores frequency-converted data to quantize the data. The Saito patent discloses a multi-stage quantization and coding based on quantization errors generated in the quantization. The Saito patent does not disclose or suggest a process employing a second quantizing step independent of a first quantizing step, as recited in Applicant's independent claims. Rather, this patent discloses generating compressed image data that includes multi-stage quantization, where each stage is dependent on the previous stage in a manner as illustrated in Figure 1 and as described at column 7, lines 4-20 of the Saito patent.

Because the Saito patent is directed to a single quantization procedure, there would have been no motivation or suggestion to combine the quantization process of the Weldy patent with that of the Saito patent. Moreover, any combination of the features described in the Weldy and Saito patents in the manner suggested by the Examiner would not have resulted in releasing space to store images. The Saito patent fails to overcome the absence of teaching or suggestion in the Weldy patent to release space in a secondary storage area of an image storage device if insufficient space is available in a primary storage area of the image storage device to store a first compressed image data set, as recited in Applicant's independent claims.

In the last paragraph on page 3 of the Office Action, the Examiner also acknowledges that “claims 19-22 further differ from Weldy, as modified by Saito, in that the claim

further requires the digital camera includes primary and secondary storage areas, and means for releasing space in the secondary storage area ... if insufficient space is available in the primary storage area of the image storage device to store the first compressed image data set.” The Examiner asserts that these “limitations are well known in the art as shown in Wakui.” The Examiner refers to Wakui’s disclosed “IC memory card 31” as the claimed primary storage area and refers to the image flash memory 20” of Wakui as the claimed secondary storage area. The Examiner concludes on page 4 of the Office Action that “it would have been obvious to one of ordinary skill in the art to modify the system of processing images in a digital camera taught in Weldy and Saito by having primary and secondary storage areas and allowing recorded image data to be selectively erased or released from the secondary storage area so as to ensure that no images are lost due to the lack of capacity of the primary storage area.”

Despite the provision of the IC memory card 31 and image flash memory 20, the Wakui patent does not teach or suggest the features for which it is relied upon by the Examiner. The Wakui patent is directed to a still video camera having an external IC memory card 31 which can be detachably attached to the still video camera 1. An IC memory card control circuit 15 functions as a “remaining memory capacity detecting means” to detect the remaining storage capacity of the IC memory card 31. See column 5, lines 42-47 and 56-59. As discussed at column 6, beginning with line 32, the still video camera 1 includes an image flash memory 20. A flash memory control circuit 19 functions as a detecting means for detecting the remaining capacity of the image flash memory circuit 20. As described at column 6, lines 45-50, the flash memory control circuit 19, the IC

memory card control circuit 15 and the system controller 2 can record image data in the image flash memory 20 or the IC memory card 31. An erasing means is provided for erasing data recorded in the image flash memory 20 or the IC memory card 31.

Contrary to the Examiner's assertions, the Wakui patent teaches away from the presently claimed invention, because this patent fails to teach or suggest **releasing space** in a secondary storage area of an image storage device if insufficient space is available in a primary storage area of the image storage device to store a first compressed image data set; rather, Wakui is only directed to using already available space of the image flash memory 20 when the IC memory card 31 is unavailable. The Examiner considers the image flash memory 20 of the Wakui patent to constitute Applicant's claimed "secondary storage area". The Examiner considers the IC memory card 31 to constitute Applicant's claimed "primary storage area". However, in the operation of video camera 1 disclosed by Wakui, there are only specific conditions in which image data is stored in the image flash memory 20, and none of these conditions correspond to **releasing space** in the image flash memory 20. Moreover, the Wakui patent is not even directed to the storage of compressed image data sets as presently claimed.

The Wakui patent does not teach or suggest "releasing space" in the image flash memory 20 to accommodate a situation where insufficient space is available in primary and secondary storage areas to store a first and second sets of compressed image data associated with a given image. Wakui does not release space of a secondary storage area which had been allocated to store a second compressed image data set to accommodate storage of at least a first compressed image data set associated with the given image. The

Wakui patent only describes storage of image data in the image flash memory 20 under specific conditions set forth, for example, at column 8, line 66 through column 9, line 6. This portion of the Wakui patent describes storing image data in the image flash memory 20 when the IC memory card is not correctly connected, or if there is not enough storage capacity for image data in the IC memory card 31. There is no teaching or suggestion that space which had been allocated to store a specific type of information in the flash memory 20 should be released to store a different type of information. This criteria for storing data in the image flash 20 is also set forth at column 14, lines 9-12.

Thus, the Wakui patent not only fails to teach or suggest features of the presently claimed invention, even when considered in combination with the Weldy and Saito patents, but more importantly, this patent actually teaches away from the presently claimed invention. At best, this patent teaches storing image data only in a portion of the image flash memory 20 which is already available for storage and which has not been previously allocated. If the combined memories are full, there is no releasing of space. This patent does not teach or suggest specifically “releasing” space of the image flash memory 20 which had been previously allocated. The Wakui patent is not directed to storing compressed image data associated with the same image in two different types of memories, with the ability to produce the same image at different resolutions as presently claimed.

Thus, independent claim 14 is allowable over the Weldy, Saito and Wakui patents regardless of whether these patents are considered individually or in the combination relied upon by the Examiner. Independent claims 22 and 29 recite similar features and are similarly considered allowable.



The Yamagata patent was cited in the rejection of claims 17, 25 and 32. However, this patent fails to overcome the deficiencies noted with respect to independent claims 14, 22 and 29. As such, dependent claims 17, 25 and 32 are allowable for at least the reasons already discussed.

The Yamagata patent is directed to an image data compression device wherein a number of image data files recorded by the image data compression device are stored in an IC in a memory card either uncompressed, in a low-compression format, or in a high-compression format (see Abstract). As described in the summary portion of the Yamagata patent, an object of this patent is to provide an image data compression device which enables a user of a still video camera to select image data that is inhibited from being compressed. This patent describes using data flags associated with image data files, where the data flags are set at the time of recording. The compression of a recorded image data file is inhibited if an associated flag has a predetermined status. Image data files which are already recorded in the recording medium can be compressed to a next higher level of compression to increase remaining capacity, as described in the summary portion of this patent.

There would have been no motivation or suggestion to have used a quantization technique as described in the Weldy patent with the features described in the Yamagata patent. Moreover, even if the Weldy, Saito, Wakui and Yamagata patents would have been combined in a manner suggested by the Examiner, the presently claimed invention would not have resulted.

The Yamagata patent does not teach or suggest **releasing** space in a secondary storage area of an image storage device if insufficient space is available in a primary storage area of the image storage device to store a first compressed image data set, as recited in Applicants' independent claim 14. Rather, the Yamagata patent is merely directed to increasing space by increasing the order of compression of image data files in a common memory area. Yamagata does not teach or suggest primary and secondary storage areas, nor does Yamagata teach or suggest releasing space in any such secondary storage area.

Independent claim 14 is therefore considered allowable over the Weldy, Saito, Wakui and Yamagata patents, considered individually or in the manner relied upon by the Examiner. In addition, independent claims 26 and 29, which recite similar features, are also considered allowable over these patents. The remaining pending claims depend from these three independent claims and are further considered allowable.

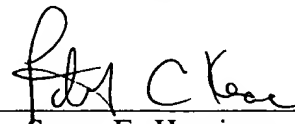
All rejections and objections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance, and a Notice of Allowance is respectfully solicited.

Respectfully submitted,

HEWLETT-PACKARD

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